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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/707,365	12/09/2003	Kenneth Boyd	81044284FGT1838PUS	1364

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EXAMINER
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2128	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

SD

Office Action Summary	Application No.	Applicant(s)	
	10/707,365	BOYD ET AL.	
	Examiner	Art Unit	
	Kimberly Thornewell	2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 May 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,7-12 and 16-29* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,7-12 and 16-29* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. In the Office Action dated 2/27/2007, claims 1-3, 7-12, and 16-29 were rejected. In the reply dated 5/2/2007, Applicants amended claims 1, 12, and 21. Claims 1-3, 7-12 and 16-29 are pending in the instant application.

Response to Arguments

2. Applicant's arguments filed 5/2/2007 have been fully considered but they are not persuasive.

Claim Rejections, 35 U.S.C. § 103

Regarding arguments presented on pages 7-9 of the Remarks, wherein applicant's argue against the Ravani reference individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Nevertheless, to further prosecution in a compact manner the following examiner responses are provided.

Regarding Applicants' statement on page 7 paragraph 2 "there is no discussion whatsoever of operating the vehicle when it is in an understeer or oversteer condition" the following Examiner Response is provided. It is noted that when a vehicle is entering a curve it is inherently understeering. This is clearly evidenced by the fact that if steering angle would remain the same while driving into the curve, the car would leave the designated lane. Oversteering is likewise

inherent in the disclosed reference. This is clearly evidenced by the fact that when a car leaves a curve if the steering were to remain the same, the car would leave the designated lane. For example, a car traveling straight and entering a right bound curve is understeering to the right, and if not corrected would leave the lane on the left side. Likewise, a car traveling in the same right bound curve and entering a straight section is oversteering, and if not corrected would leave the lane on the right side.

Ravani teaches these inherent features (fitting a car into a curve / coming out of curve) in Fig 1 element 20 / "lane curvature", Fig 4, 5 and the respective descriptions as well as col 8 line 20-39 which discloses lateral error (oversteering / understeering thresholds).

Statements presented on page 7 last paragraph to page 8 first paragraph have been fully considered but are unpersuasive for the reasons above.

Regarding statements presented on page 8 first full paragraph, the statements are at best a general allegation of patentability with conclusionary statements reciting claim language. Ravani indeed discloses an understeering situation as explained above. Wheels cannot be instantly moved from one position to another, they first go through intermediary steps until the target angle is reached. While the wheels in Ravani are angled from an old position to a new position the error decreases until such time that the wheels fit the curvature of the road.

Regarding page 8 last paragraph, Applicants appear to argue that because understeering is not taught by Ravani reference, that there would not have been motivation to combine the features taught by the 35 U.S.C. § 103 rejection. It has been established above that Ravani indeed discloses understeering, oversteering, and more. Thus, Applicants' arguments have been considered but are unpersuasive.

Accordingly, it is submitted that Ravini, combined with Ghoneim, teaches Applicants' claimed invention. Therefore, the rejection of the claims under 35 USC § 103(a) is maintained.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-5, 7-9, 12-14, 16-18, 21-22 and 25-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ravini et al., US Patent no. 5,979,581, in view of Ghoneim et al., US Patent no. 6,205,391.

As per claim 1,

Ravani discloses a simulation system for simulating an operation of an automotive vehicle comprising:

- In input providing vehicle information **(figure 1 reference 12)** and path information **(figure 1 reference 20)**; and
- A controller coupled to the input **(figure 1 reference 16)**, said controller having a vehicle computer model therein **(column 5 lines 57-59)**, said controller programmed to:

- Determine an initial non-zero steering wheel angle input to the computer model **(column 8 lines 13-19**, *initial steering wheel angle input taught as 0 for a straight roadway and* **column 8 lines 25-39** *non zero in curves*);
- Determine a first steering wheel angle input to the computer model at a time later than the initial steering wheel angle input by comparing a look ahead point and an intended path (**column 2 line 39-42**);
- Operate the computer model with the initial steering wheel angle input until an error of the first steering wheel angle and the initial steering wheel angle is decreasing (**figures 6b and 6d**, *shown as steering input remaining at 0 until t=5s*);
- When the error decreases, operate the computer model with the first steering wheel angle input (**figures 6b and 6d**, *shown as steering input being above 0 when t>5s*); and
- Generate an output in response to the vehicle model and the initial steering wheel input or the first steering wheel input (**column 8 lines 52-57**).

Ravini does not disclose expressly the operating the computer model with the initial steering wheel angle until the error is decreasing when the vehicle is understeering, or the controller determining when the vehicle model is understeering in response to a yaw acceleration greater than a threshold and an increasing steering wheel angle. Ghoneim discloses estimation of vehicle yaw, wherein understeer (instability) is determined in response to a yaw acceleration greater than a threshold (**column 5 lines 18-35**) and an increasing steering wheel angle (**column 3 lines 8-22**).

It would have been obvious for one of ordinary skill in the art of steering simulation, at the time of the present invention, to modify Ravini's system for simulating operation of an automotive vehicle with Ghoneim's method for determining when the vehicle is understeering. It would have further been obvious to apply Ravini's step of operating the computer model with the initial steering wheel angle input until the error decreases at a time when the vehicle is understeering because Ghoneim teaches inputting a measured steering wheel angle when the vehicle is in an instable (understeering) mode and error is present (**column 3 lines 8-22**, *invalid yaw rate*), in order to reduce the error and re-validate the yaw rate. The motivation for doing so would have been to improve accuracy of steering by providing a valid yaw rate and keeping a vehicle from becoming instable (Ghoneim column 1 lines 32-57).

As per claim 2,

Ravani discloses the controller controlling an output device in response to the vehicle model and the initial steering wheel input (**column 8 lines 52-57**).

As per claim 3,

Ravani discloses the model comprising a dynamic control model **(column 5 lines 57-59)**.

As per claim 7,

Ravani discloses the controller determining an increasing steering wheel angle by comparing the initial steering wheel angle input to the first steering wheel angle input (**column 7 lines 32-35**).

As per claims 8 and 9,

Ravani discloses the controller determining the error in response to a decreasing steering wheel angle and the initial steering wheel angle and the first steering wheel angle input (**column 8 lines 25-45**).

As per claim 12,

Ravani discloses a method of operating a vehicle computer model having vehicle information **(figure 1 reference 12)** and path information **(figure 1 reference 20)** therein, the method operating on a digital computer system and comprising:

- Determining an initial non-zero steering wheel angle input to the computer model **(column 8 lines 13-19**, *initial steering wheel angle input taught as 0 for a straight roadway and* **column 8 lines 25-39** *non zero in curves*);
- Determining a first steering wheel angle input to the computer model at a time later than the initial steering wheel angle input by comparing a look ahead point and an intended path (**column 2 line 39-42**);
- Operating the computer model with the initial steering wheel angle input until an error of the first steering wheel angle and the initial steering wheel angle is decreasing (**figures 6b and 6d**; *shown as steering input remaining at 0 until t=5s*);

- When the error decreases, operating the computer model with the first steering wheel angle input (**figures 6b and 6d,** *shown as steering input being above 0 when t>5s*); and
- Outputting results of the operating step (**column 8 lines 52-57**).

Ravini does not disclose expressly the operating the computer model with the initial steering wheel angle until the error is decreasing when the vehicle is understeering, or the controller determining when the vehicle model is understeering in response to a yaw acceleration greater than a threshold and an increasing steering wheel angle. Ghoneim discloses estimation of vehicle yaw, wherein understeer (instability) is determined in response to a yaw acceleration greater than a threshold (**column 5 lines 18-35**) and an increasing steering wheel angle (**column 3 lines 8-22**).

It would have been obvious for one of ordinary skill in the art of steering simulation, at the time of the present invention, to modify Ravini's method of operating an automotive vehicle with Ghoneim's method for determining when the vehicle is understeering. It would have further been obvious to apply Ravini's step of operating the computer model with the initial steering wheel angle input until the error decreases at a time when the vehicle is understeering because Ghoneim teaches inputting a measured steering wheel angle when the vehicle is in an instable (understeering) mode and error is present (**column 3 lines 8-22**, *invalid yaw rate*), in order to reduce the error and re-validate the yaw rate. The motivation for doing so would have been to improve accuracy of steering by providing a valid yaw rate and keeping a vehicle from becoming instable (Ghoneim column 1 lines 32-57).

As per claim 16,

Ravani discloses determining an increasing steering wheel angle by comparing the initial steering wheel angle input to the first steering wheel angle input (**column 7 lines 32-35**).

As per claims 17 and 18,

Ravani discloses determining the error in response to a decreasing steering wheel angle and the previous steering wheel angle and the first steering wheel angle input (**column 8 lines 25-45**).

As per claim 21,

Ravani discloses a method of operating a vehicle computer model having vehicle information **(figure 1 reference 12)** and path information **(figure 1 reference 20)** therein, the method operating on a digital computer system and comprising:

- Determining a plurality of steering wheel angle inputs, each associated with a different time stamp, to the computer model by comparing a look ahead point and an intended path at various times (**figure 6, column 8 lines 13-19**);
- Holding the steering wheel angle to a first one of the plurality of steering wheel angle inputs until an error determined as a function of the plurality of steering wheel angle inputs is decreasing (**figures 6b and 6d,** *shown as steering input remaining at 0 until t=5s*);

- When the error decreases, operating the computer model with one of the plurality of current steering wheel angle inputs subsequent to the first steering wheel angle input (**figures 6b and 6d,** *shown as steering input being above 0 when t>5s*); and
- Outputting results of the operating step (**column 8 lines 52-57**).

Ravini does not disclose expressly the operating the computer model with the initial steering wheel angle until the error is decreasing when the vehicle is understeering, or the controller determining when the vehicle model is understeering in response to a yaw acceleration greater than a threshold and an increasing steering wheel angle. Ghoneim discloses estimation of vehicle yaw, wherein understeer (instability) is determined in response to a yaw acceleration greater than a threshold (**column 5 lines 18-35**) and an increasing steering wheel angle (**column 3 lines 8-22**).

It would have been obvious for one of ordinary skill in the art of steering simulation, at the time of the present invention, to modify Ravini's method of operating an automotive vehicle with Ghoneim's method for determining when the vehicle is understeering. It would have further been obvious to apply Ravini's step of operating the computer model with the initial steering wheel angle input until the error decreases at a time when the vehicle is understeering because Ghoneim teaches inputting a measured steering wheel angle when the vehicle is in an instable (understeering) mode and error is present (**column 3 lines 8-22**, *invalid yaw rate*), in order to reduce the error and re-validate the yaw rate. The motivation for doing so would have been to improve accuracy of steering by providing a valid yaw rate and keeping a vehicle from becoming instable (Ghoneim column 1 lines 32-57).

As per claim 22,

Ravani discloses determining a plurality of current steering wheel angle inputs comprising periodically determining the plurality of current steering wheel angle inputs (**figure 6d, taught as the steering inputs being determined as a function of time**).

As per claim 25,

Ravani discloses operating the computer model with one of the plurality of current steering wheel angle inputs subsequent to the first steering wheel angle input comprising operating the computer model with one of the plurality of current steering wheel angle inputs subsequent to the first steering wheel angle input that corresponds in time to a decreased error (**column 8 lines 54-57**).

As per claims 26 and 27,

Ravani discloses determining the error in response to a decreasing steering wheel angle and the first steering wheel angle input (**column 8 lines 25-45**).

5. Claims 11-12, 19-20, 23-24, and 28-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ravani in view of Ghoneim as applied to claims 1-5, 7-9, 12-14, 16-18, 21-22 and 25-27, and further in view of Yasui, US Patent no. 5,373,911.

As per claims 11-12, 19-20 and 28-29,

Ravani discloses determining error in response to a decreasing steering wheel angle and the previous steering wheel angle and the first steering wheel angle input (**column 8 lines 25-45**). Neither Ravani nor Ghoneim disclose, however, the error being determined in response to a difference of the previous steering wheel angle and the first steering wheel angle input compared to a threshold. Yasui discloses a vehicle steering system that determines error by a difference of a previous steering wheel angle and the first ("desired") steering wheel angle (**column 7 line 62-column 8 line 1**).

It would have been obvious to one of ordinary skill in the art of vehicle simulation, at the time of the present invention, to modify Ravani/Ghoneim's steering simulator with Yasui's error detection method in order to achieve a steering simulator that determines error by comparing a difference of a desired steering wheel angle with a previously determined steering wheel angle against a threshold. The motivation for doing so would have been to improve automatic guidance of an automotive vehicle by detecting malfunction (Yasui column 2 lines 3-7).

6. Claims 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ravani in view of Ghoneim as applied to claims 1-5, 7-9, 12-14, 16-18, 21-22 and 25-27, and furhter in view of Nagaoka, Japanese patent 07-320188.

As per claims 23 and 24,

Neither Ravani nor Ghoneim disclose expressly the yaw acceleration comprising a normalized yaw acceleration. Nagaoka discloses a method for estimating the yaw rate of a

vehicle using the steering angle, wherein the normalized yaw acceleration comprises a steering wheel angle normalized yaw acceleration (**abstract of invention, constitution**).

It would have been obvious to one of ordinary skill in the art of vehicle simulation, at the time of the present invention, to modify Ravani/Ghoneim's steering simulator with Nagaoka's use of *normalized* yaw acceleration based on the steering wheel angle in order to achieve a simulation method that determines understeering in response to a steering wheel angle normalized yaw acceleration. The motivation for doing so would have been reduce the burden of a computer operating the computer model by using a presumed yaw acceleration (Nagaoka paragraphs 0005 and 0006).

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kimberly Thornewell whose telephone number is (571)272-6543. The examiner can normally be reached on 9am-5:30pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamini Shah can be reached on (571)272-2279. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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